45 Fungal endophytes of the Boab species *Adansonia gregorri* and other native tree species

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INTRODUCTION

In southern Africa dying Boabs have been reported and subsequent surveying of these trees has indicated the presence of the fungal pathogen *Lasiodiplodia* which may be the cause of the decline. Due to the close genetic relationship of the African and Australian Boabs and the fact that these two continents share are large amount of floral families, they may subsequently also share the pathogens of many of these plants. The surveying of the otherwise healthy Australian Boab and surrounding tree species deemed a prudent course of action.

In this study Boabs were surveyed in 25 sites in the Kimberley region and material was also taken from surrounding tree species at 3 sites. Endophytic fungi that were isolated from these samples were identified using both molecular and morphological data and seven new species were described (2). The pathogenicity of identified species to Boabs was determined. This is the first study to identify endophytes of the *Adansonia* and to conduct pathogenicity trials on these trees.

MATERIALS AND METHODS

Stem and leaf material was collected from a range of sites across the Kimberlys, Western Australia. Material was taken from *Adansonia gregorrii* and a range of native flora in the same area. Endophytes were isolated using standard protocols (1).

Lesion development in seedling tap roots. 24 isolates that represented the genetic diversity of samples collected were used to inoculate the tap root of four-month-old Boab seedlings. They were inoculated by using a sterile scalpel blade to make a small lateral incision along the middle of the carrot. Into which a 1 cm^2 agar plug colonised with mycelium was inserted face up. This was then lightly wrapped with parafilm. There were 24 isolates plus controls (10 replicates of each). Tap roots from each replicate were placed in random order onto wooden racks inside plastic. The containers were then sealed with aluminium foil and tape and placed into a 25C room and left for 4–5 days. After four days lesion development in the tap roots were measured. The lesions presented as a rotted mass that could easily be scraped out of the tap root. The inoculated tap root was weighed, the lesion was scraped out and the carrot was re-weighed immediately. The lesion length and width was also measured.

Lesion development in young trees. 2–3 year old Boab trees were harvested in Kununurra from commercial Boab growers "Boabs in the Kimberlies.". They were planted within 2 weeks of initial removal into one meter long PVC pipes in a potting medium of 1/3 coarse river sand and 2/3 potting mix and were watered twice a day for ten minutes by an automatic dripping system. Nine isolates were selected from the tap root trial. Boab stems were inoculated in the same manner as the roots. There were 5 replicates for each of the 9 isolates and also non-inoculated controls. After 6 months trees were assessed for leaf cover and stems with lesions were harvested. The width, length and depth of lesions were measured using callipers and a ruler. The stems were cut in half at the centre of the initial mycelium plug insertion in order to determine the depth of lesion development.

At the extreme margin of the lesions the wood was cut away using a knife in order to establish the extent of interior lesion development.

RESULTS AND DISCUSSION

433 fungal isolations were made, 282 of these consisted of isolates belonging to Botryosphaeriaceae including species of *Neofussicoccum, Pseudofusicoccum, Lasiodiploidia Dothiorella* and *Neoscytalidium.*

For the trial with tap roots, isolates from the *Lasiodiplodia theobromae* complex produced the largest lesions. *Neofusiccocum ribis* and *Neoscyltalidium novaehollandia* caused moderate lesions and isolates of *Lasiodiploida crassispora, Dothiorella longicollis, Pseudofusicoccum adansoniae* and *Fusicoccum ramosum* all caused minor lesions indicating low virulence.

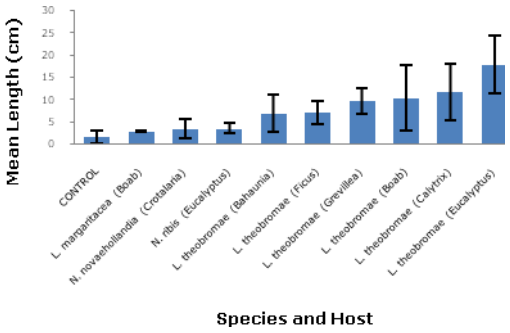

Figure 1. Mean length(cm) of lesions in 2–3 year old boab trees. Standard deviations are represented by the error bars.

The results of the tree trial (Figure 1) confirm the results of the preliminary investigation, *L. theobromae* was found to be significantly more pathogenic then other species considered in the study. The lesions produced from inoculation of boab stems by *L. theobromae* resulted in the lesions lengths ranging from 3 cm to 25cm (mean= 10.68cm). *N. ribis* and *Neoscytalidium novaehollandia* both exhibited similar lesion severity (means= 3.46 cm and 3.54 cm respectively).

This trial indicates the potential threat that *L. theobromae* presents to the iconic Boab trees. Recently a dying Boab in Broome was reported with similar disease symptoms those of dying Boabs in South Africa and similarly, *L. theobromae* was the only pathogen isolated from the cankers. As shown in this trial, endophytes such as *L. theobromae* are capable of causing disease and killing Boabs in Australia.

REFERENCES

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